**DEPARTMENT OF CHEMISTRY**

**SHRI G. S. INSTITUTE OF TECHNOLOGY AND SCIENCE, INDORE**

**COURSE COMPLETION UNIT PLAN**

**Course: M.Sc. (Applied Chemistry) Semester III**

**Paper: CH91308 Advance Organic and Medicinal Chemistry**

**Name of Faculty: Dr. Sushma Sharma and Dr. Deepal Agrawal**

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| **Lecture No.** | **Brief description of Topic to be taught** | **Reference/Remarks** |
|  | **Unit-I**  **Advanced Stereochemistry and its applications** | **Books**  1. Organic Chemistry of Drug Synthesis Lednicer D. & Lester A. Mitscher, (John Willy & sons).  2. Groggins, P. H., Unit processes in organic synthesis (McGraw Hill publication).  3. Eliel E.L., Stereochemistry of Carbon Compounds (John Willy & sons).  4. Kalsi P.S., Stereochemistry of Organic Compounds (New age International).  5. Srivastava M.M., Green Chemistry (Narosa publication).  6. May’s, Chemistry of Synthetic Drugs (UNODC Publications).  **Journals:**  1. Chirality  2. Tetrahedron: Asymmetry - Journal - Elsevier  3. Journal of Chemical Education –ACS  4. Journal of Environmentally Friendly Processes  5. Journal of Green Science and Technology |
| 1 | Introduction to role of stereochemistry in Pharmacokinetics and Pharmacodynamics. |
| 2 | Introduction to selective organic transformation,concept of chemoselectivity and their role and impact in synthesis of drug. |
| 3 | Concept of regioselectivity and stereoselectivity and their role and impact in synthesis of drug. |
| 4. | Introduction of concept of racemic switches and dynamic stereochemistry and their influence in synthesis of drug. |
| 5. | What are stereoselective synthesis, their application and effect in drug synthesis. |
| 6 | Introduction of chiral homogenous and heterogeneous catalysts. |
| 7 | Chemical constitution of chiral homogenous and heterogeneous catalysts. |
| 8 | Uses of chiral homogenous and heterogeneous catalysts. |
|  | **Unit –II**  **Drug design and Chiral techniques in synthesis of drugs** |
| 9 | Concepts of pro drugs and soft drugs. |
| 10 | Principles of drug parameters and their use to synthesis new drug. |
| 11 | Designing of new drugs using green chemicals. |
| 12 | Concept of chiral drugs and their effect on drug activity. |
| 13 | Asymmetric synthesis of Vitamin C and Atenolol and their therapeutic uses. |
| 14 | Asymmetric synthesis of Nifedipine, Ethambutol and their therapeutic uses. |
| 15 | Asymmetric synthesis of Omeprazole, Aspertame and their therapeutic uses. |
| 16 | Asymmetric synthesis of Ampicillin and Thalidomide and their therapeutic uses. |
|  | **Unit-III**  **Mechanism and application of some reaction in drug synthesis** |
| 17 | Mechanisms, stereochemistry and applications of Birch reduction and Mannich reaction. |
| 18 | Mechanisms, stereochemistry and applications of Diel’s alder reaction. |
| 19 | Mechanisms, stereochemistry and applications of Meerwein Ponndorf verley reduction. |
| 20 | Mechanisms, stereochemistry and applications of Oppeneaur oxidation. |
| 21 | Mechanisms, stereochemistry and applications of Catalytic hydrogenation reactions and difference in birch reduction and catalytic hydrogenation reactions. |
| 22 | Mechanisms, stereochemistry and applications of Ozonolysis. |
| 23 | Mechanisms, stereochemistry and applications of Reformatsky reaction. |
| 24 | Mechanisms, stereochemistry and applications of Michael reaction. |
|  | **Unit –IV**  **Eco-friendly Techniques in organic synthesis** |
| 25 | Properties and advantage of using water as solvent. |
| 26 | Introduction,properties and advantage of ionic liquids in organic synthesis. |
| 27 | Introduction,properties and application of supercritical liquids. |
| 28 | Introduction,properties and mechanism of supported reagents and catalysts. |
| 29 | Introduction, application and advantage solvent free reactions. |
| 30 | Introduction of microwave & ultrasound assisted synthesis. |
| 31 | Properties and advantage of microwave & ultrasound assisted synthesis. |
| 32 | Application and advantage of biocatalytic synthesis. |
|  | **Unit-V**  **Unit processes** |
| 33 | Introduction and types of reagents used in Nitration, sulphonation, halogenation, oxidation and reduction. |
| 34 | Mechanism of reagents used in nitration, sulphonation, halogenation, oxidation and reduction. |
| 35 | Mechanism, controlling factors and applications of nitration. |
| 36 | Mechanism, controlling factors and applications of sulphonation. |
| 37 | Mechanism, controlling factors and applications of halogenation. |
| 38 | Mechanism, controlling factors and applications of oxidation . |
| 39 | Mechanism, controlling factors and applications of reduction. |
| 40 | Introduction to Drug and Pharmaceutical Industries: varoius divisions and their working. |